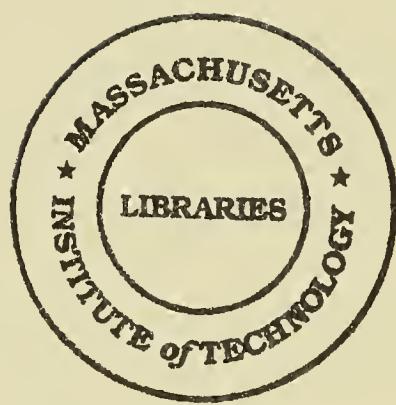


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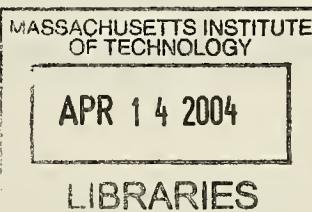
SHOULD CHINA APPRECIATE THE YUAN

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Should China Appreciate the Yuan?

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M.I.T.

Jan. 15, 2004

I. Introduction

The economists' theory of international trade, that it is a substitute for international movements of factors (i.e. labor and capital), is being demonstrated by Chinese exports to the U.S. and other industrialized countries. It is not a, "yellow peril," of Chinese immigrants that is frightening the current U.S. administration and some Congressional politicians. It is the wave of imports of Chinese goods. These have generated new pressures for tariff protection, quantitative restrictions and, somewhat unusually, calls for appreciation of the Chinese yuan. For example in July of 2003 a group of U.S. congressman called for restrictions on textile imports for China to protect the U.S. textile industry.¹ They, as well as the Secretary of Treasury, himself, have claimed that Chinese manipulation of the yuan exchange rate was giving Chinese exports an unfair trade advantage, although subsequently the charge was withdrawn.² The yuan has been pegged to the dollar for many years, but it is argued that it is really undervalued and, if the yuan/dollar exchange rate were allowed to float, the yuan would appreciate. The failure of the Chinese to permit this to happen, it is asserted, has, on the one hand, been responsible for the rapid growth in Chinese exports to the U.S. and displacement of U.S. industry and, on the other hand, limitations on the growth of U.S. exports to China.³

The issues to be addressed here are the reasons for the rapid growth of imports into the U.S. from China and whether they warrant an appreciation of the yuan.

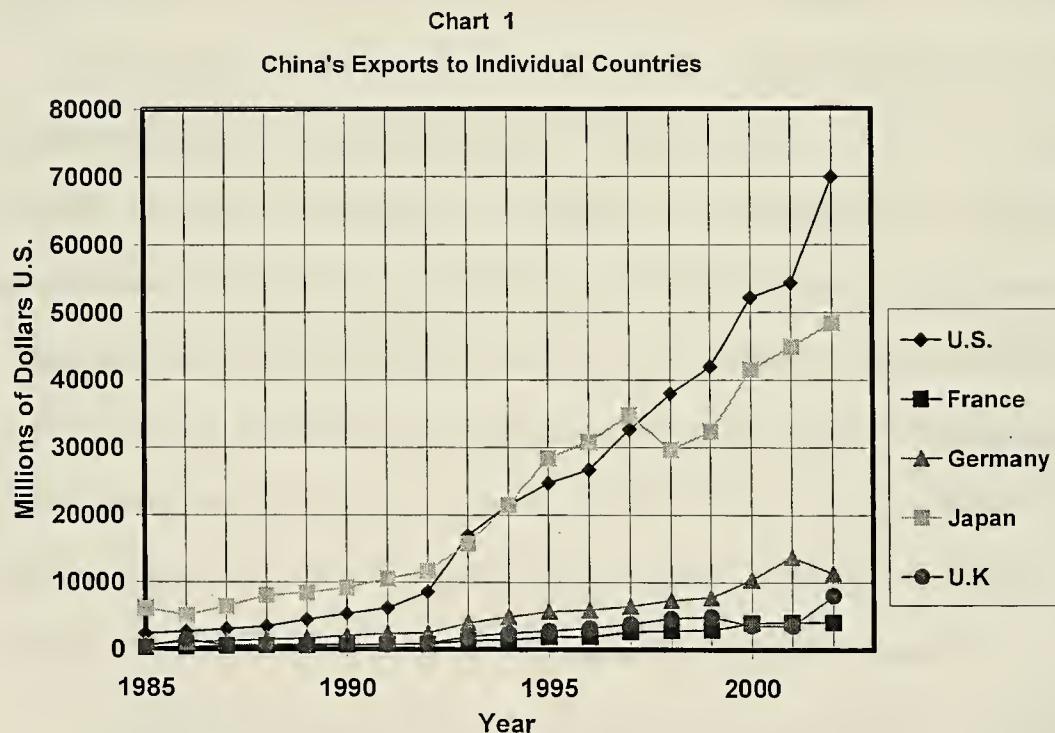
¹ David Barboza, "U.S. Textile Companies Call for Curbs on China," *The New York Times*, July 28, 2003, 1.

² Edmund L. Andrews, "Treasury Loosens Pressure on China Over Exchange Rate," *New York Times*, Oct., 31, 2003, C2.

³ Christopher Bodeen, "China Brushes Off Free Currency Pressure," *Associated Press*, Sept. 3, 2003.

II. Just the facts

The bare facts of Chinese exports to the U.S. and some of the other major industrialized countries do appear extraordinary as shown in Chart 1.⁴ The U.S., while the second largest importer of Chinese goods and services for many years, outstripped Japan by 1998. Table 1 shows the growth rates corresponding to the paths traced out in Chart 1. China has clearly been penetrating the markets of the industrialized countries rapidly. There is a puzzle, however, in the differential rates at which this has been happening in the separate countries. There will be a return to this puzzle below.



A slightly different view is provided in Chart 2, which presents Chinese imports as a share of total imports. They are far more important in Japan than in any other

⁴ Unless otherwise noted, all the data used are from the IMF, *International Financial Statistics* and *Direction of Trade Statistics*, Washington, D.C. and the World Bank, *International Development Indicators*, World Bank.org, Washington, D.C..

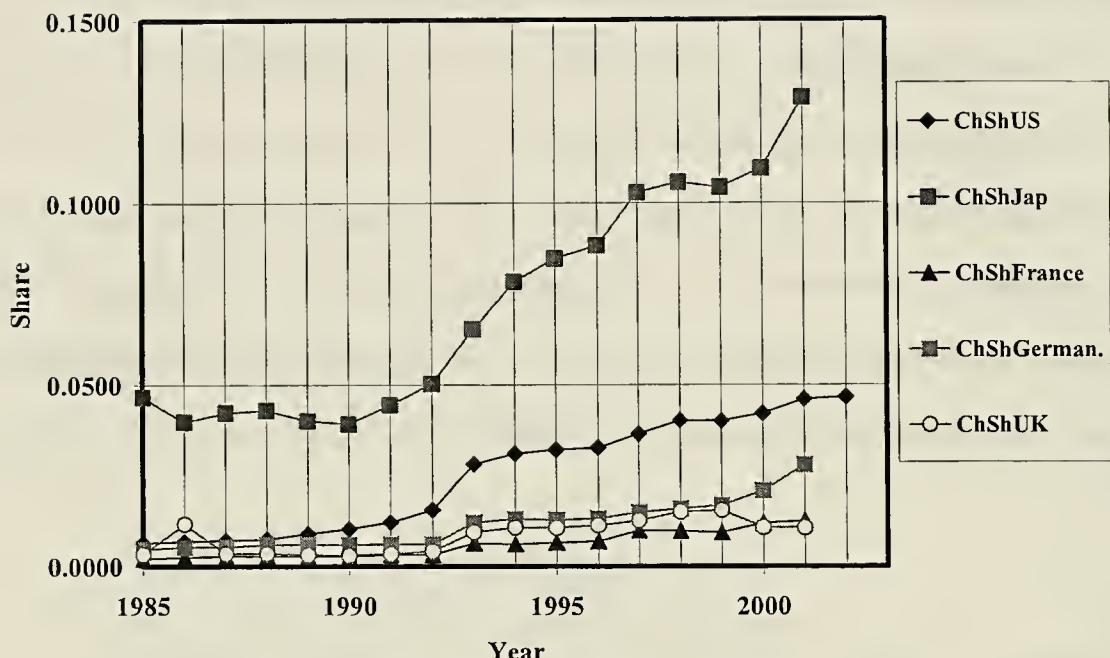
country. In the U.S., which is a poor second, Chinese imports have not reached five per cent of total imports. They are much less important in the European countries.

There is a debate between U.S. and China official authorities as to whether Chinese exports to the U.S. are actually understated. The U.S. argument is that a substantial part of Hong Kong's exports originate in China and are transshipped with little or no additional processing. The U.S. position has been used as another argument for restriction of Chinese imports by means of quantitative controls, tariffs or by making Chinese goods more expensive through an appreciation of the Chinese currency.

Table 1
Growth Rates of Chinese Imports

Year	U.S.	France	Germany	Japan	U.K.
1986	12.7	40.8	35.5	-16.6	309.8
1987	15.1	35.8	21.0	25.9	-63.7
1988	12.2	18.1	21.9	25.9	23.9
1989	29.9	2.5	7.9	4.3	-3.6
1990	20.4	23.9	28.2	9.7	4.6
1991	16.5	12.4	14.3	14.2	9.6
1992	38.9	4.2	3.9	11.2	26.8
1993	97.4	68.8	62.3	34.9	108.9
1994	26.2	10.4	22.4	36.2	25.2
1995	15.5	29.2	16.7	32.5	15.6
1996	8.0	3.5	3.2	8.5	14.6
1997	22.5	39.9	11.0	12.7	19.4
1998	16.1	6.0	13.2	-14.7	21.3
1999	10.5	3.5	5.8	9.0	5.3
2000	24.2	34.9	33.8	28.1	-26.4
2001	4.2	3.9	32.3	8.3	-1.8
2002	28.7	-0.8	-17.4	7.8	128.5

Chart 2
China's Share in Imports

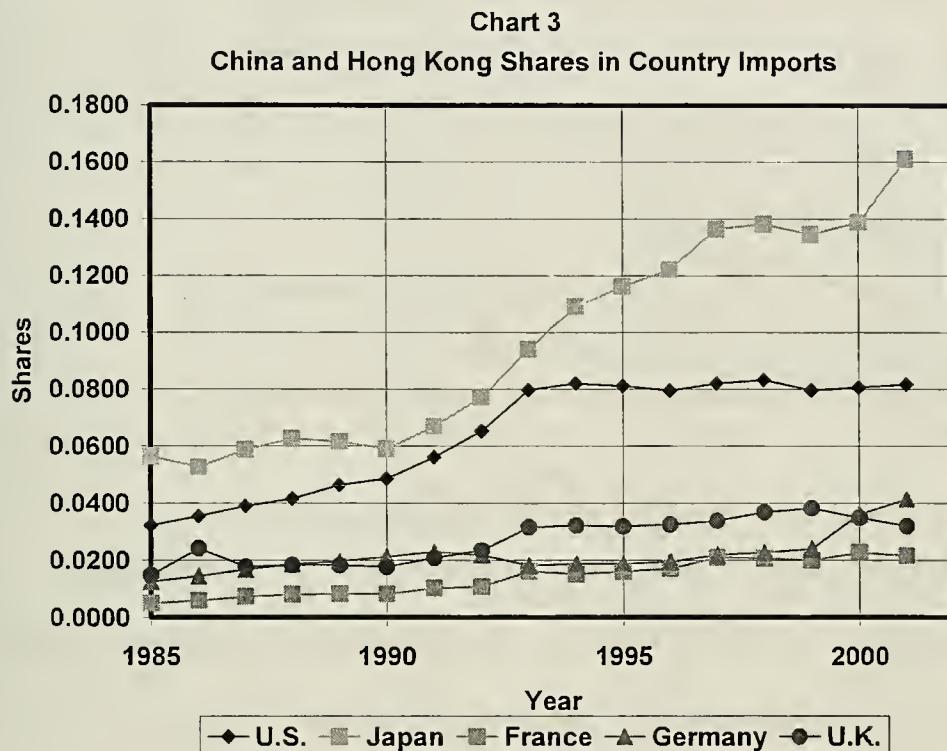


The Chinese say that they do their best to account for Hong Kong transshipments in their own data and, in any case, there is little value added in much of China's own exports, with small amounts of local processing added to imported goods.⁵ A careful analysis by U.S. based scholars, that tries to account for Hong Kong's transshipment of Chinese goods, concludes that the U.S. estimate of the merchandise trade deficit with China in 1998, instead of being \$56.9 billion was \$36.9 billion.⁶ Chart 3 sheds some light on the question by simply adding together imports from both China and Hong Kong. It more or less disposes of the controversy. The striking demonstration in Chart 3 is that

⁵ For a careful representation of this view see, Jialin Zhang "U.S.- China Trade Issues After the WTO and the PNTR Deal: A Chinese Perspective," Hoover Press : EPP 103 DP5 HPEP030100 08-01-99 16:31:25 00 rev1

⁶ K. C. Fung, Lawrence J. Lau,"New Estimates of the United States-China Bilateral Trade Balances," Stanford: Institute for International Studies, Stanford University, April 1999.

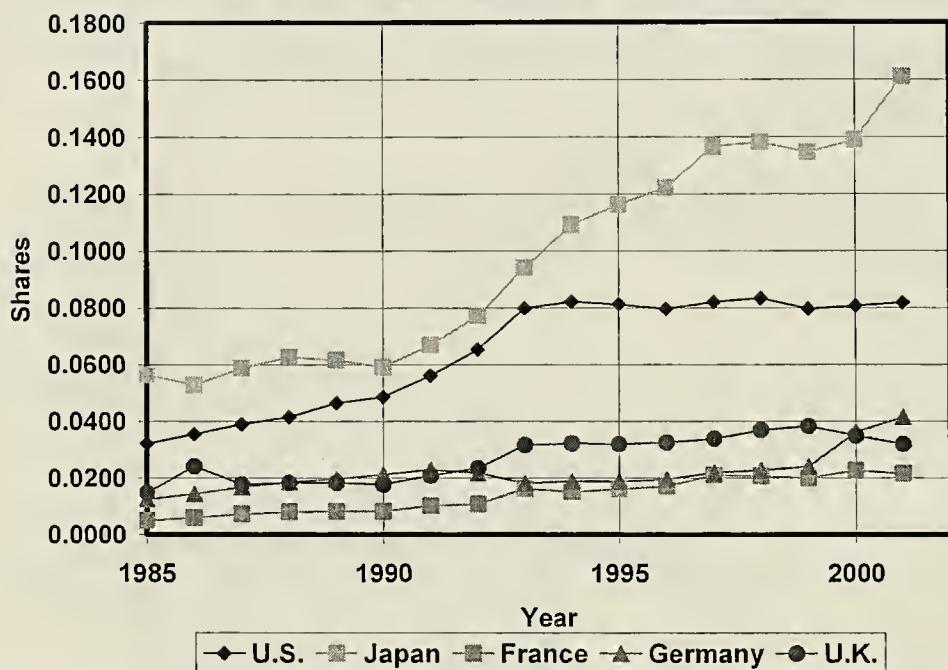
after 1993 the sum of China's and Hong Kong's share in U.S. imports has remained virtually unchanged. Moreover, that relative constancy has been true for all the other countries except Japan, where the sum of the two shares has continued to rise.



When China devalued its currency in 1994, Hong Kong kept its exchange rate virtually constant. That, itself, would contribute to the displacement of Hong Kong own exports by Chinese goods. The hypothesis suggests itself that to some degree Chinese exporters have been learning that they can do without Hong Kong intermediaries in their export business and have also found that they can perform as well, and at lower cost, any final processing that had been done in Hong Kong.

A consequence of China's persistent balance of payments surpluses has been the accumulation of very large foreign exchange reserves. In 2002, Chinese foreign exchange reserves minus gold were \$214 trillion, second only to Japan's \$339 trillion.

Chart 3
China and Hong Kong Shares in Country Imports



China is a large country, however, so that most associated economic magnitudes are large. In order to indicate the relative size of the reserves, some ratios are shown in Table 2. As a ratio to imports, Chinese reserves are second only to Japan, but as a ratio to GDP, there are a number of other countries with larger reserves. As a ratio to population, Chinese reserves are relatively small. If the foreign exchange reserves of China and Hong Kong are combined, their ratios to their imports would be about the same as those of India, Indonesia and Korea.

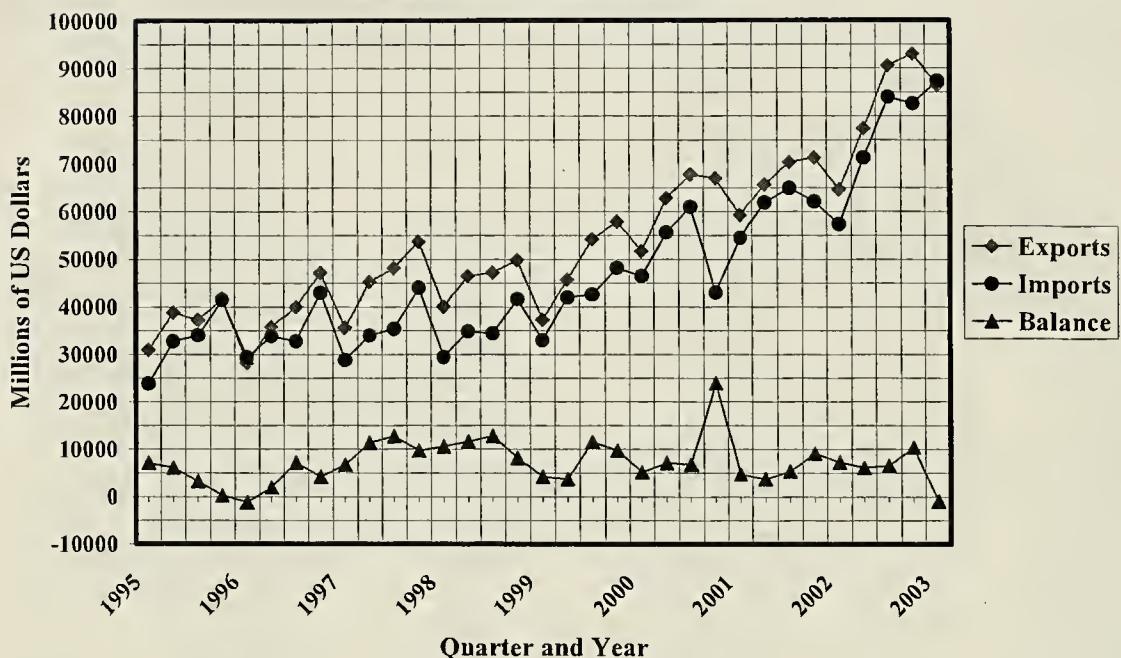
As background information it may be useful to have an overall view of Chinese exports and imports. That is shown in Chart 4, with quarterly exports, imports and balance traced out. Total Chinese exports have grown rapidly, as have imports, both with

Table 2

COUNTRY	Reserves/Imports per cent	Reserves/GDP per cent	Reserves/Population US Dollars
JAPAN	61.23	8.53	2668.05
CHINA,P.R.MAINLAND + HONG KONG	43.62	21.19	230.20
CHINA,P.R.: MAINLAND	51.52	17.31	167.17
CHINA,P.R.:HONG KONG	35.17	50.95	12152.00
INDONESIA	43.52	13.17	107.59
INDIA	43.42	9.66	47.48
KOREA	38.30	18.72	1873.55
SPAIN	37.30	3.91	616.87
THAILAND	34.89	22.14	454.21
ISRAEL	34.49		2727.69
NORWAY	31.42	8.03	3351.75
RUSSIA	29.81	9.35	224.92
TURKEY	27.75	10.89	285.96
CZECH REPUBLIC	26.63	24.90	1697.03
MALAYSIA	24.02	26.45	1035.68
DENMARK	19.07	11.36	3694.11
SWITZERLAND	16.05	11.02	4086.61
AUSTRALIA	15.74	3.71	777.15
MEXICO	14.23	5.84	368.75
CANADA	8.50	3.80	865.98
SINGAPORE	8.31	69.37	14488.69
FRANCE	7.99	1.48	351.00
UNITED KINGDOM	7.90	1.86	491.89
GERMANY	7.02	1.90	456.25
ITALY	6.68	1.78	363.25
UNITED STATES	2.96	0.48	173.35

a pronounced four quarter cycle. Yet the trade balances show no clear trend. In the first quarter of 2003, the last period for which data are available, the balance turned negative for the first time in this series.

Chart 4
China's Exports, Imports and Balance



III. Trade balancing and the exchange rate

The notion that there should be a bilateral trade balance between the U.S. and China, or at least it should not be too unequal, is a popular one, particularly beloved of politicians. Yet the arguments for the advantages of international trade do not at all require that trade be balanced bilaterally and bilateral balancing would be fortuitous. Even if there were evidence of particular bilateral discrimination, trade balancing would not make countries better off in the conventional theory. There might be something to be said for it as a threat or bargaining device, if there were such discrimination, but that would depend on particular circumstances.

Related to the contention that there should be a bilateral trade balance is another claim: that the Chinese yuan is undervalued relative to the dollar, against which it has fluctuated within only a relatively narrow range since the devaluation of the yuan in

1994. Chart 5 provides some information relevant to this argument. It presents indices with a 1985 base of the end of period principal yuan exchange rate against the dollar and as well the IMF's yuan real effective exchange rate, the, "reef," and the real exchange rate against the dollar. For purposes of comparison, the real effective exchange rates of the Malaysian ringgit and the Thai baht. The IMF, first defines the, "neer,":

a nominal effective exchange rate index adjusted for relative movements in national price or cost indicators of the home country and selected countries and the Euro Area

Then the real effective exchange rate index, the reef, represents

the ratio of an index of the period average exchange rate of the currency in question to a weighted geometric average of exchange rates for the currencies of the selected countries and the Euro Area⁷

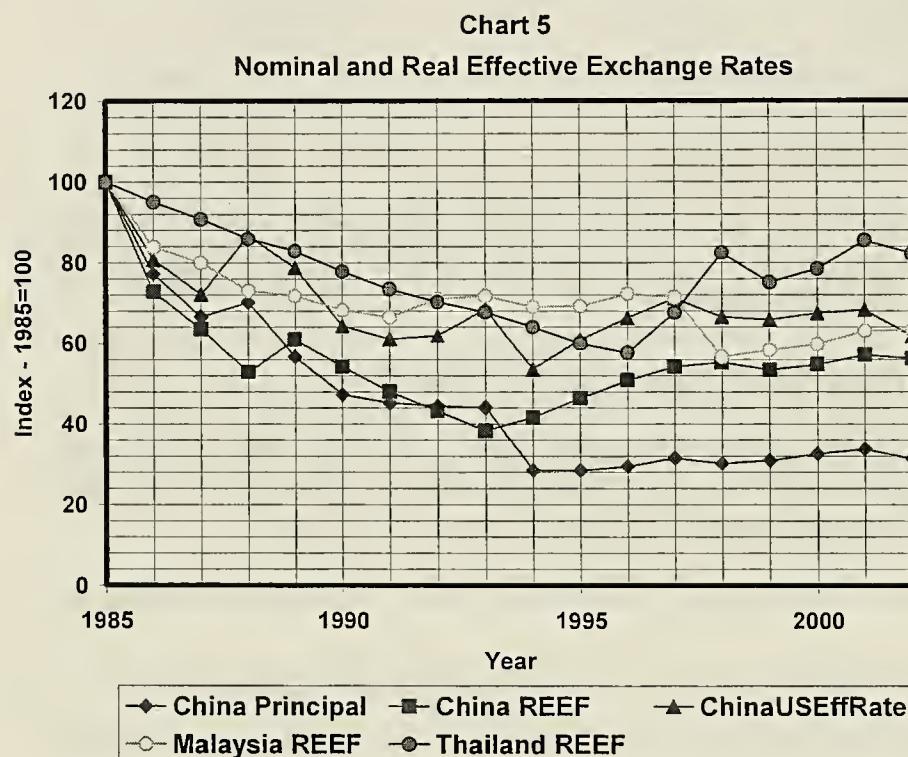
The real exchange rate of the yuan against the dollar adjusts the principal rates only for movements in the relative prices of consumer goods in China and the U.S..

As can be seen the yuan's principal rate declined from 1985 to 1994, after which it has remained relatively steady. China's reef declined until 1993 and since then has appreciated as China's domestic prices rose relative to the prices in the comparison group of countries. The corresponding calculation of a real exchange rate, with only Chinese and U.S. price adjustments, also declines to 1994, subsequently appreciating slightly, but remaining relatively steady since 1998. Its appreciation since 1994 has been greater than the Malaysian ringgit but less than the Thai baht.

Thus, there is no basis for a claim that the value of the yuan has been intentionally devalued against the dollar. In spite of the fixed peg of the yuan against the dollar,

⁷ International Monetary Fund, International Financial Statistics Yearbook, 2002, Washington, D.C., p. x.

because of relative changes in domestic prices, Chinese goods have, on the average, become slightly more expensive in the U.S. in recent years.



There is another argument that Chinese authorities should float the exchange rate and that would lead to its appreciation. The controversy over the relative advantages of fixed versus floating exchange rates will be passed by here. There have been attempts to estimate the equilibrium dollar/yuan exchange rate.⁸ However, the underlying issue in the debate about the dollar/yuan exchange rate is not the value of the equilibrium exchange rate. It is, rather, "What is the optimal exchange rate for the yuan?" That type of question is always difficult to answer for any exchange rate and an answer will not be

⁸ Chou, W.L. and Shih, Y.C., "The Equilibrium Exchange Rate of the Chinese Renminbi," *Journal of Comparative Economics*, March, 1998, 26,1, 165-174.

attempted. The relevant issues will be illustrated in order to demonstrate that they have often been overlooked.

A bilateral trade imbalance with the U.S. certainly does not indicate that the yuan/dollar exchange rate is wrong. What is surely relevant for trade and exchange rate policy in both the U.S. and China are their overall balances. It is not quite correct to put aside the contentious issues of U.S. trade and exchange rate policy and to focus only on China, because all exchange rates are relative. That, however, will be done, with the excuse that Chinese imports are still only a small part of total U.S. imports.

Chinese authorities may well believe that China is particularly vulnerable to trade fluctuations. Its oil and other commodity import volumes have been growing rapidly and already impose large foreign exchange requirements. The depreciation of the dollar against the euro during recent years has meant a loss of purchasing power in Europe of Chinese dollar reserves, although the continued pricing of oil and other commodities in dollars has provided some protection to their value. Appreciation of the yuan against the dollar would mean further losses. Given the volatility of foreign exchange markets and international capital markets, it would be understandable if Chinese authorities fear the possibility of a liquidity crisis in foreign exchange. Self-insurance against such a crisis by maintaining large stocks of foreign exchange is expensive, but may be regarded as a necessary cost..

Even an overall trade imbalance would not necessarily be an indicator of a wrong exchange rate. The, "right," exchange rate depends not only on trade flows but also on domestic savings and international capital flows and domestic resource constraints. China has had both unusually high rates of domestic savings rates and foreign direct

investment, permitting extraordinarily high overall rates of investment, reaching 38 percent in 2001 and 2002. Its accumulation of exchange reserves is not an easy alternative to their use to increase its real domestic investment at still higher rates as there are real domestic constraints on further investment, other than the availability of goods imported with additional foreign exchange. As a result, still higher investment rates would create a substantial risk of domestic inflation.

Might the exchange reserves be used to increase imports of consumer goods? If there were inflationary pressures in China, those imports would help damp the pressures. The accumulation of reserves is just an aspect of the high savings rate in China. After the inflation pressures of the 1980's and early 1990's there have been few signs of inflationary pressures until recently. The more pressing danger over the last five years or so has been deflation, in spite of the large injections of currency used to buy up foreign exchange earnings.⁹ By maintaining the peg to the dollar, the Chinese authorities have avoided the phenomenon of, "Dutch disease," and, in effect, protected their domestic industry, although that might not have been the major objective.

Even an annual assessment of capital as well as trade flows is not sufficient in assessing the appropriateness of the exchange rate and foreign exchange adequacy. Intertemporal considerations may well call for an accumulation of reserves for some period of time in anticipation of potential long term as well as short term adversities or requirements.

⁹ A warning against the inflationary pressures of accumulating reserves was issued by Alan Greenspan, chairman of the U.S. Federal Reserve system. See Keith Bradsher, "Shift by China Might Not Aid U.S. Industry, Fed Chief Says," *New York Times*, December 12, 2003, C11.

There may be still other reasons for China's reserve accumulation policy. At least two more suggest themselves. First, if China has ambitions to become an international financial center, those large reserves will be helpful. They would provide cushions against unusual demands by second parties trading in yuan for other international currencies. Second, in a world in which economic and political issues are intermingled in international negotiations, China may believe that the fact of the large international reserves may provide it with some bargaining power.

The contention that China's yuan is undervalued revives the analysis of, "exchange rate protection," that began in the early 1980's.¹⁰ China may be determined to fix its exchange rate at a relatively low level in part to protect its domestic market. That, in effect, has been alleged by some potential U.S. exporters, who want China to, "open up its markets," by appreciating its exchange rate. This kind of protection is not envisaged in the World Trade Organization agreements, so there is no appeal to the WTO. Of course the U.S. could deflate its own prices, but that is not likely to happen.

IV. What really determines Chinese imports into the U.S.?

It is risky to undertake a quantitative answer to this question, mainly because of the limitations of the available data. To some degree Chinese foreign trade, both exports and imports, have continued to be regulated and government directed for years after the beginnings of its economic reforms. It is difficult for an outsider to know just when it started to respond solely or even mainly to market signals. A conventional date which is

¹⁰ W. Max Corden and J. Peter Neary, "Booming Sector and De-Industrialization in a Small Open Economy," *The Economic Journal*, 92, 368, Dec., 1982, 825-848, Christopher Bliss and Vijay Joshi, "Exchange Rate Protection and Exchange Rate Conflict," *Oxford Economic Papers*, New Series, 40, 2, June, 1988, 365-377.

used is 1985, although some degree of government interference has continued since then. Most of this was supposed to have been put aside with the signing of the agreement with the World Trade Organization in 1999, but there have been complaints by that organization that some of the interferences continue.¹¹ Thus, the times series available for analysis is both short and of suspicious quality. It is better, however, to try to glean as much as possible from the data than to be satisfied with anecdotes.

Regressions have, therefore, been estimated with China's annual exports to the United States as the dependent variable. A number of explanatory variables have been tried, having in mind, however, that the shortness of the annual data set, from 1985 to 2002, limits the number of the explanatory variables that can be used.

The U.S. demand for Chinese exports has been estimated on the assumption that the supply of Chinese exports is perfectly elastic, but shifts up and down, depending on the relative attractiveness of markets other than the U.S.. The latter has been represented by the euro/dollar rate. Experimentation was undertaken with alternative price variables. The first is the real exchange rate between the dollar and the yuan, for which the end-of-year exchange rates were adjusted by relative consumer prices in the two countries. Regressions were also estimated with the IMF's estimates of the net effective exchange rate, neer, and the real effective exchange rate, reef, as the price variable. U.S. GDP was used as the income variable. Ordinary least squares regressions were estimated, but the regressions estimated with corrections for autocorrelation and heteroskedasticity provided more significant coefficient estimates. Results are shown in Table 3.

¹¹ Elizabeth Becker, "Report Faults China's Policies Since It Joined Trade Group," *New York Times*, December 20, 2003, B3.

The regression results may be regarded as surprisingly good, perhaps too good, given the quality of the data. The China-U.S. real exchange rate coefficient is significant at the 10 per cent level and, in an alternative regression, the coefficient on neer, the IMF net effective exchange rate, significant at the 5 per cent level. The estimated coefficients on the other variables are all significant at the 5 per cent level. Similar regressions using the Chinese reef as an explanatory variable in place of the China-U.S. real exchange rate did not produce a significant coefficient.

Since the regressions were estimated with logarithms of the variables, the coefficients are elasticities. All, and especially the estimated elasticity on the U.S. GDP, are quite large, although the coefficients on the real exchange rate, neer and the euro/dollar rate are not completely implausible. The growth in Chinese exports to the U.S., while the yuan was depreciating from 1985 to 1994, are reflected in the estimated elasticities on the alternative yuan real exchange rates. It should be recalled, however, that those rates have hardly changed in the last six years, so the increase in Chinese exports to the U.S. in this period cannot have been due to a depreciation of the yuan. The estimated elasticity with respect to the euro rate suggests that there is a real shifting of Chinese exports between the U.S. and European markets depending on the relative exchange rates, which, of course, is just what one would expect. It helps explain the otherwise perplexing difference between the growth rates of Chinese exports to European countries, as compared to the U.S..

The estimated coefficients on GDP, although significant, are implausibly high. Recalling impressions to the naked eye from Chart 1, Chinese exports to the U.S. seem to have moved in two or three phases: 1985 to 1992, 1993 to 1999 and, perhaps, 1999 to

2003, jumping up from one trend to the next. The estimated coefficient on the US GDP variable may, to some degree, be picking up those movements. Further trials with dummy variables for the suspected different phases suggested that this might be the case, but were not at all definitive. The time series may be too short, the apparently different trends may not be real or the model may be misspecified. It is true, however, that in all the alternatives tested, the coefficient on the logarithm of USGDP remained significant. That, itself, is not surprising; it is only the size that is suspicious.

Overall the results do not lend credence to the argument that the rapid growth of Chinese exports to the U.S. in recent years has been due mainly to a depreciation of the exchange rate, since that has not occurred. The modest growth in U.S. GDP 2001 and 2002 has certainly been important and outweighed the depreciation of the dollar relative to the Euro.

Table 3

	Dependent Variables	
	China's exports to U.S.	China's share of U.S. imports
lnChUS real exchange rate	-0.2951** (-2.01)	-0.2737** (-1.99)
lnChneer		-1.4382* (-4.02)
lnUSGDP	3.2995* (9.49)	2.5823* (6.97)
lnEuro rate	-0.4173* (-2.20)	-1.5353* (-3.31)
constant	-43.0238* (-9.33)	-59.5164* (-4.70)

V. Conclusions

The argument that the rapid growth in Chinese exports in recent years is the result of a depreciation of the yuan is certainly not borne out by the data, since such a

depreciation has not occurred. The argument ignores the effects of the euro/dollar rate in directing Chinese exports to the U.S. and also ignores the effects of overall U.S. economic growth in attracting imports. The recent depreciation of the dollar against the euro means that the yuan has also depreciated against the euro. The regression results indicate that this will result in a diversion of China's exports from the U.S. to the euro area, accomplishing to some degree the effect of an appreciation of the yuan against dollar. Nor is the argument at all persuasive that the bilateral trade deficit, itself, reveals an undervalued yuan.

The claim that the size of China's foreign exchange reserves is evidence of the undervaluation of the yuan may be correct. However, there are plausible grounds for the reserve accumulation. Their weight depends on assessments of many elements: domestic production capacities, potential exchange rate and capital market volatilities and ambitions to become an international financial center.

Because of the implausibly high estimates of the U.S. income elasticities for Chinese exports, suspicions emerge that other influences are at work, that are not reflected adequately in the regressions. The data may be reflecting non-market influences, such as the still existing government subsidies to state owned enterprises and state owned enterprises still account for roughly fifty per cent of Chinese exports. The underlying comparative advantage of Chinese exports may have shifted as Chinese firms improve their technologies and ability to target U.S. markets. The very large size of the Chinese economy mean that even small adjustments in these factors can result in changes that are big relative to the economies of other countries, even the U.S.. Further analysis with more disaggregate data might help answer some of the questions.

Nonetheless, it is possible that China's exchange rate is below its optimal value. Its foreign reserves are quite large, some might say that they are excessively large. Yet it would be understandable if these were maintained because Chinese authorities were concerned about the potential volatility of a floating exchange rate. There is enough world-wide experience to justify that. It would also be understandable if the Chinese authorities were concerned about the potential volatility of international capital markets and their possible recourse to those markets and want to self-insure by maintaining large reserves.

Overall, a little logic and even the little evidence, as produced here, does not warrant the conclusion that the yuan should be appreciated. Yet, in spite of the costs, Chinese authorities may decide on an upward adjustment in response to their own reevaluations of their foreign exchange needs and/or foreign pressures.

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